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ABSTRACT

Streamlining involves the modification of cost-analysis methods to make them more appropriate for the limited time and resources, and immediate information needs, of local-level program evaluations. It can also enhance the reliability and validity of district-level studies. A review of existing texts of cost analysis and of studies of traditional cost analysis methods reveals their limited usefulness for district-level evaluators and strengthens the argument for the use of streamlined methods. This guide focuses primarily on two stages of a cost-outcome analysis: measurement of program costs and measurement of program outcomes. Measuring program costs involves: (1) listing program resources; (2) identifying resources representing direct cost to the district; and (3) determining the cost of resources. The parameters of the program, the reliability of "free" resources, as well as present and annualized values need to be included in the total cost figure, and a sensitivity analysis should be conducted. Streamlining the measurement of program outlines involves attention to using a quasi-experimental design, evaluating a single program, and the use of one or more of four cost analysis methods: (1) cost-feasibility; (2) cost-utility; (3) cost-effectiveness; and (4) cost-benefit. A brief annotated bibliography is appended. (IW)

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# EVALUATION GUIDES



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Guide Number **16**

## COST-OUTCOME ANALYSIS: STREAMLINING TECHNIQUES

Jana K. Smith

1985

Techniques for streamlining the use of  
cost-outcome analysis are described,  
including

- Purpose of This Cost-Outcome Guide Series
- Rationale for Streamlining
- Streamlining Techniques for Measuring Program Costs
- Streamlining Techniques for Measuring Program Outcomes
- References
- Annotated Bibliography
- Appendix

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No.	Title
1	Microcomputers and Evaluation
2	Cost-Outcome Analysis: Measuring Costs
3	Microcomputers: Word Processing
4	Cost-Outcome Analysis: Measuring Outcomes
5	Microcomputers: Statistical Analysis Software
6	Investigative Journalism Techniques
7	Microcomputers: Data Base Management Software
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12	Evaluation Design: The Evaluator and the Architect
13	Microcomputers: Communication Software
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## PURPOSE OF THIS COST-OUTCOME GUIDE SERIES

This guide series was developed in response to evaluators' reported need for information on how to conduct cost-outcome analyses. Recent studies on the use of cost-outcome analyses by state education agency (SEA) evaluators (Smith and Smith, 1984) and local education agency (LEA) evaluators (Smith, 1984) showed that:

1. 60 percent of all SEAs anticipate requests in the next five years to conduct cost-outcome analyses;
2. 71 percent of metropolitan LEAs anticipate requests in the next five years to conduct cost-outcome studies; and
3. one of the primary impediments to the conduct of cost-outcome analyses is the absence of useful guides and resources.

To assist these and other evaluators in conducting cost-outcome analyses, three "how-to" guides were developed. Although several texts currently exist on cost-outcome analysis, they tend to be written in technical language and do not give sufficient attention to the collection of outcomes as well as costs. The three guides on cost analysis supplement existing texts by providing concise, readable explanations on how to conceptualize and conduct cost-outcome studies for program evaluation.

The first cost guide (No. 2 in the series) introduces four types of cost-outcome analysis, directs the collection of cost data, and explains how to select the most appropriate cost-outcome analysis to answer an evaluation question. The second cost guide (No. 4 in the series) describes how to design an outcome study and outlines the procedures for collecting outcome data for cost-utility, cost-effectiveness, and cost-benefit analyses.

This third cost guide was developed specifically for use by program evaluators in local education agencies. It describes several techniques that can be used to "streamline," or expedite, the steps of a cost-outcome study. The guide focuses primarily on educational program evaluations, but the methods described are applicable to any evaluation conducted for internal decision-making.

## RATIONALE FOR STREAMLINING

Guides No. 2 and No. 4 describe the steps of traditional cost-outcome studies for state and local educational evaluations as advocated by economists, cost-analysts, and evaluators. The

assumptions and emphases of the two guides are similar to those of existing texts. This third cost guide differs from the previous two in its emphasis on practicality. It suggests ways to streamline the conduct of a cost-outcome study.

Streamlining involves the modification of cost-analysis methods to make them more appropriate for the limited time and resources, and immediate information needs, of local-level program evaluations. In comparison to traditional formal methods, streamlined methods can:

- increase the likelihood of cost analysis methods being used by program evaluators in local education agencies;
- increase the interpretability of study results at the local level; and
- provide more immediately useful information to local decision makers, while sacrificing generalizability to other settings.

While streamlining has several advantages over more formal cost-analysis methods, it would not be useful unless the reliability and validity of study results are preserved. The suggestions outlined in this guide preserve these standards. They increase local usefulness by shifting the focus to the immediate program setting, away from concerns about generalizing, to other populations or settings. Therefore, results of such studies are not appropriate for distribution to other programs, since there is a danger of misinterpretation and over-generalization.

Because the concept of streamlining is new, some explanation for its development is warranted. The following sections discuss the traditional view of cost analysis, the orientation of existing texts on the subject, current applications of cost analysis methods for program evaluation, and how streamlining can improve the reliability and validity of cost-analysis studies for local program evaluation.

### The Basis of Traditional Cost-Analysis

Up to this time, many program evaluators have viewed cost analysis as a time-consuming and technical technique justifiable for only major studies. This view is supported by most existing texts, which describe those cost-analysis methods best suited for answering societal-level questions. For example, Levin (1983) discusses the measurement of "opportunity costs," i.e., all costs to the program--monetary and non-monetary--to determine "the value of the sacrifices made by society--the value of what must be given up--to undertake an intervention" (p. 80). This concept of societal sacrifice is important for the evaluation of major

public interventions. However, it is less important for small, informal evaluations. Most available texts are based on this concept of societal or public-welfare criteria (e.g., Thompson, 1980, or Sugden & Williams, 1978).

### The Orientation of Existing Texts of Cost Analysis

Many texts make the assumption that societal-level questions can lessen the usefulness of cost analysis to program evaluators. Table 1 illustrates this lack of accord by comparing the assumptions of most current cost-analysis texts to the conditions under which most cost analyses are conducted in local program evaluations.

Table 1

#### Differences Between Text Assumptions and Practicing Conditions

<u>Text Assumptions</u>	<u>Practicing Conditions</u>
Based on public welfare	Based on sponsor needs
National or International level	Organizational level
Large-scale public policy	Small scale program evaluation
Evaluates 2+ programs	Evaluates 1+ program(s)
Experimental design	Quasi-experimental design
Generalizability is important	Generalizability is not important

Table 1 makes clear the reasons why existing texts have been of limited usefulness to district-level evaluators. These evaluators conduct studies to answer program-specific questions, often designed around a single program. Non-generalizability of results is usually not a problem, since the results of the study need not be applicable beyond the specific program. Decision makers want only a credible answer to their evaluation questions.

### Current Applications of Cost Analysis Methods in Program Evaluation

Recent studies of applications of cost analysis methods at the state level (Smith & Smith, 1984) and local level (Smith, 1984) show that many educational evaluators are currently conducting some form of cost analysis, and many will be sharply increasing their use of the procedure over the next five years.

An examination of the types of studies currently being conducted, however, shows that they tend to be of a "home-grown" variety rather than reflective of the formal procedures

prescribed by economists (Smith & Smith, 1984). Program evaluators tend to use simple analysis methods, such as cost descriptions of a single program, rather than a comparison of the cost-outcome ratios of two or more programs. It is not surprising that the methods used in local evaluations differ from those methods advocated by current texts: Because the local cost analysis studies are conducted under a short timeline, the questions addressed are of a highly specific nature, and the results are not intended for use outside the program.

### The Case for Streamlined Methods

Pitz and McKillip (1984) have presented a cogent argument against the use of traditional cost-analysis methods for program evaluation. They contend that methods based on the concept of public welfare rather than on the values of the decision makers may not provide useful evaluation information. Most cost analysts agree that the study design must be tailored to best meet the needs of the decision maker. For example, Thompson (1980, p. 105) writes that in order "for a benefit-cost analysis to serve decisionmakers best, it must accurately reflect their values." Similarly, Levin (1983) directs the reader to assess the needs of the primary audience prior to selecting an analysis method. However, the goal of meeting the needs of the primary audience can get lost if one adheres strictly to a formal system.

Streamlining advocates a thoughtful rather than a restrictive approach to the conduct of a cost-outcome study, with analysis strategies chosen because of their local applicability. Most of the streamlining techniques suggested in this guide are also mentioned in the traditional cost-analysis texts, but they are difficult to isolate from the technical detail required for a societal-level study.

An example is the technique of excluding the cost of "free" resources such as volunteers or donated equipment which is suggested by Levin (1983). This guide presents many such recommendations, with an overriding perspective on emphasizing practicality. Examples of questions that could be profitably addressed with streamlined methods are as follows:

Which was the most cost-effective reading program in the district this year--peer tutoring or computer-assisted instruction?

What were the costs and effects of supplemental math instruction for fifth-grade students?

## The Effect of Streamlined Methods on the Reliability and Validity of District-Level Studies

It is important that streamlining not compromise the reliability and validity of cost analysis procedures. With careful implementation, these concerns can be successfully addressed. In fact, it is often the haphazard and careless implementation of the comprehensive, formal, highly technical procedures that impair reliability and validity. Therefore, in some local settings reliability and validity will be enhanced by streamlining.

Consider the reliability issue first. If the recommended procedures are poorly understood or beyond the scope of local resources, program-level cost analyses will probably not be conducted in a systematic manner. The techniques used may be based on local conditions such as availability of personnel or pre-existing data that are not entirely appropriate. Hasty estimation of financial figures may be substituted for careful calculation.

In contrast, the provision of a sensible, systematic approach to cost analysis will increase the likelihood of reliable data and accurate documentation. A study conducted using a systematic method can be replicated in later years for comparison purposes.

With regard to validity, streamlined methods will increase the meaningfulness of the results to the personnel who use them. It has already been argued that the traditional methods, as described in available texts, are often not appropriate for local decision making. Haggart (1978) argues that the calculation of costs using methods which emphasize generalizability of results do not provide an accurate description of actual program costs. Accurate accountings of such program costs are needed if a study is to be valid for decision makers.

### **STREAMLINING TECHNIQUES FOR MEASURING PROGRAM COSTS**

There are two stages of a cost-outcome analysis: measurement of program costs and measurement of program outcomes. The rest of this guide focuses primarily on these steps. It is assumed that the reader is familiar with Guides No. 2 and No. 4 in this series, so that specific steps for determining costs and outcomes will not be restated here. The discussion will be limited to streamlining techniques.

The two steps given in Guide No. 2 for figuring program costs include:

- listing program resources, and
- calculating the costs of those resources.



To streamline the calculation of program costs, an intermediate step can be added:

- identifying resources that represent direct cost to the sponsor.

If the evaluation question pertains to the direct cost assumed by the sponsor, the calculation of program cost should include only those resources that involve direct costs. Let's look at each of these steps.

#### Step 1: Listing Program Resources

The identification and detailed description of all program resources is critical to the conduct of a valid cost analysis. This step requires substantial investigation by the evaluator. (As described in Guide No. 2, the budget should not be used in this step except as to verify that no resources were omitted.)

The goal of this activity is to provide a written description of all program resources, including such topics as the job descriptions of all paid and volunteer staff, and the activities of parents who must transport students to and from the program. An observer considering adoption of a program should be able to tell from the listing of resources exactly what it would take to start up or operate the program. This step is the most important aspect of the entire costing procedure.

#### Step 2: Identifying Resources Representing Direct Cost to the District

In most cases, the decision maker wants to know what it costs to start up or operate the program (see Guide No. 4 for a discussion of the differences between start up and operation costs). This generally does not require the calculation of the value of resources such as volunteer time. For instance, while it is important to know that the program requires 6 hours of students' time and one hour of parents' time per week, the monetary value of this time is relatively unimportant, since it is not a direct cost the sponsor must absorb.

Traditional cost-analysis methods, which assess the opportunity costs of a program, would require that the monetary value of the parents' and students' time be calculated using econometric methods. All these costs would then be included in the program total cost. Such inclusion of opportunity costs would spuriously elevate the total cost figure for local analysis purposes.

The cost total should only include those resources that currently require district funding, or are expected to do so in the future. Following are two factors in identifying which

resources should be included in the total cost figure:

1. the parameters of the program;
2. the reliability of the "free" resources.

First, consider the parameters, or scope, of the program when deciding which resources to include in the cost figure. If a program is an adjunct to regular school programming, then only those costs over and above the regular school costs need to be included. For example, a reading program that pulls students out of regular class for one hour a week is an adjunct to regular instruction. Only the cost of the pull-out program needs to be calculated, not the cost of running the school building (e.g., electricity, maintenance) during that hour, since it would be open in any case. Although space and furniture are being used, they are part of regular school equipment and their cost is "sunk," that is, paid for out of a general account by the district regardless of use.

You could also compare the list of resources, crossing out the common ones for both programs. Those resources used in both programs, such as space, equipment or instructors (if their salaries were comparable) will increment the total cost by equivalent amounts, and so could be cancelled out. This is called a marginal cost analysis and is described by Levin (1983) and Thompson (1980). For most school program evaluations, a marginal cost analysis is probably quite appropriate, and it greatly simplifies the figuring of program costs. (Returning to the previous caution, however, it is apparent that this procedure limits the generalizability of cost estimates to other settings.)

The second factor involved in the total cost figure is the cost of resources that are not paid for with program or district funds (such as volunteer time or donated equipment). These may not need to be figured. For each such resource, the evaluator should determine whether the resource will continue to be available at no charge. If there is reason to believe that a free resource will not be available for the duration of the study's time span, then the cost of that resource should be included in the total cost figure. If, however, the resource will continue to be available at no cost, it need not be included. Following are some typical resources that may not involve direct cost to the sponsor:

- building rental;
- borrowed, inherited, or donated equipment;
- equipment paid for in previous years;
- student, parent, or volunteer time;
- student-purchased equipment;
- inservice training provided by external agencies.

The final report should contain a listing of all program resources, whether or not they are included in the total cost figure. A separate listing of all resources excluded from the

cost total should also be provided, along with a rationale for the exclusion of each resource.

### Step 3: Determining the Cost of Resources

Use of Market and Shadow Pricing. Each resource remaining on the list after the "no-cost" items have been checked off must be assigned a cost. Guide No. 2 in this series described the use of market-pricing and shadow-pricing techniques for valuing resources. In market pricing, the open-market value of a resource is used as a cost estimate. In shadow pricing, the open-market value of a similar or equivalent resource is used.

For the vast majority of program-level resources, market pricing is used. Shadow pricing is helpful when the resource is no longer a market commodity, as might be the case with a discontinued microcomputer model. However, program resources for which shadow-pricing techniques would be needed probably no longer represent a cost to the sponsor. In this event, the resource need not be included in the program cost figure.

The budget can also be used to obtain a limited amount of information about the cost of some resources. While there are reasons against using the budget to determine program costs, it can provide useful information for some resources. For instance, the salary of personnel (including benefits) can be obtained. The evaluator should carefully consider the accuracy of each budgeted figure before incorporating it in the cost analysis. An example of a worksheet that incorporates each of the three steps in the tabulation of program costs is provided in the Appendix.

### Figuring Present and Annualized Values

When the time span of an evaluation exceeds a year, it is necessary to determine the present and annualized values of some resources. Guide No. 4 explains how to calculate these figures. For local-level evaluation, however, if only the direct cost of the program to the sponsor for a year is requested, then present and annualized values need not be figured. This treatment of program costs will contribute to a distorted view of typical program costs (e.g., the estimate of program cost may be significantly elevated due to the purchase of equipment). But it may address the decision maker's immediate information needs. An explanation should be provided in the evaluation report about the treatment of resource cost estimates where calculation of present or annualized values might be warranted.

## Conducting a Sensitivity Analysis

You may have guessed that estimating program cost is a tentative procedure. The accuracy of cost estimates can vary due to many factors. For example, what if a no-cost resource suddenly becomes a cost resource? Perhaps the current microcomputer will need to be replaced with a new one, or will need extensive repair. It is important to talk with program staff to obtain their judgments about the stability of program resources. As another example, there may be uncertainty about the reliability of the cost estimate (e.g., the new microcomputer will cost from \$5,000 to \$8,000). In such cases, traditional cost analysts recommend a sensitivity analysis.

A sensitivity analysis can be conceptualized as a best case/worst case scenario. In the microcomputer example, the best case would involve the microcomputer continuing to function with no necessary repairs for the rest of the year. In the worst case, the microcomputer might need to be replaced, which could increase the program cost by \$5,000 to \$8,000.

The lowest possible costs for all resources with uncertain values should be summed to provide an overall best case. Similarly, the highest possible costs should be summed to provide an overall worst case. These scenarios, along with a central tendency value of possible costs, should be provided to the decision makers.

### A Note of Caution

When implementing these suggestions, the previously stated questions need to be borne in mind. For instance, the addition of one large one-time cost for a program resource to a one-year cost estimate could be misleading if the study results were used to estimate program costs in subsequent years, or if the results were disseminated to other districts as a representative description of program costs. Such misuses of the data are to be carefully avoided.

If streamlined methods are to make a positive contribution to program evaluation methodology, the use of the streamlined methods and the resultant data must be relevant to the specific evaluation question. These methods are entirely appropriate when used judiciously.

## **STREAMLINING TECHNIQUES FOR MEASURING PROGRAM OUTCOMES**

This section looks at methods for streamlining the measurement of program outcomes. Guide No. 4 looked at the identification and measurement of outcome variables and explained how to interpret cost-outcome (e.g., cost-utility,

cost-effectiveness, and cost-benefit) ratios. Again, for the sake of brevity, these will not be restated here.

This section is brief because suggesting methods of streamlining the assessment of program effectiveness to evaluators is like suggesting methods of streamlining the assessment of program costs to economists; that is, knowing the most efficient methods of collecting effectiveness data is the evaluator's stock in trade. The purpose of this section is to review a few streamlining techniques for outcome measurement practices that most evaluators have used for years.

### Using a Quasi-Experimental Design

Although Guide No. 4 is presented as compatible with texts on traditional cost analysis methods, it does differ from existing texts in one significant way: it recognizes the use of quasi-experimental research designs. The guide discusses possible effects on the results due to non-random assignment, both of participants to programs and of programs to treatments. In many cases, quasi-experimental designs are not luxuries, but necessities for the completion of evaluations. When used with appropriate safeguards, they can be viewed as streamlining the assessment of program outcomes.

### Evaluating a Single Program

Another assumption held by traditional cost analysts is that the methods are always conducted for comparative purposes. The reason for this assumption is understandable: a cost-outcome ratio is uninterpretable until it is compared with another ratio. Guide No. 4 provides an example of a cost-effectiveness analysis of two reading programs. The cost-effectiveness ratio of one program was 7 to 1. In other words, it cost \$7.10 to produce each point improvement on a reading test. The figure has little intrinsic meaning: it is meant to be used in a comparison. If the cost-effectiveness ratio of a second program was 2, the ratios can be interpreted. The \$7.10 per point in the first case is seen to be much less cost effective than the \$2.00 per point in the second.

Despite the problem of interpreting a single cost-outcome ratio, many evaluations involve only one program. There are ways, however, to provide comparisons without evaluating two discrete programs. For example, an evaluation of peer tutoring could be conducted by comparing peer-tutoring at the fifth grade with peer-tutoring at the sixth grade. In addition, cost-outcome data collected in one year could be used during that year for program management, then compared to a replication of the study in the following year. There is also the case study approach, which provides contextual detail on cost data for management purposes, and on outcome data for evaluation purposes.

## Types of Cost-Analysis Methods

There are four cost-analysis methods: cost-feasibility, cost-utility, cost-effectiveness, and cost-benefit. Each method can be described as follows:

Cost-Feasibility. Cost-feasibility is, by definition, the most streamlined of the cost analysis methods because it does not involve assessment of program outcomes. As a result, it also does not require comparison with another program in order to be meaningful. An examination of the cost data for a single program can be very helpful for program managers. The type of information that this kind of examination can provide is discussed in Guide No. 4.

Cost-Utility. Cost-utility analysis involves the subjective valuing of probably program outcomes, and does not require collection of empirical outcome measures. A frequent criticism of this method is that it is too subjective, and therefore an unreliable measure of program value. However, the systematic application of the method underlying cost-utility analysis--multiattribute utility analysis--can provide information that is very useful to decision makers, since it systematically aggregates and summarizes their own values.

In general, cost-utility analysis is the most underrated of all cost analysis methods. Pitz and McKillip (1984) have recently come out in strong support of its use in decision making. Guide No. 4 discusses how to conduct a cost-utility analysis.

Cost Effectiveness. Cost-effectiveness analysis has been widely recognized as the method of choice for social service program evaluation. It requires the collection of traditional effectiveness data, and as such is second-nature to program evaluators. Guide No. 4 provides a listing of examples of effectiveness data typically used by evaluators.

Most evaluators are familiar with methodological approaches to streamlining, such as sampling program participants, or using instruments with established reliability and validity. In addition, the evaluator may want to consider using the data collected for different purposes, such as data for statewide testing, or data required for federally funded programs such as Chapter 1 programs.

The evaluator could obtain access to available effects data and reconstruct the cost data retrospectively. If care is taken to preserve accuracy, this procedure can provide information that is very useful to managers and decision-makers. Therefore, the conduct of a cost-effectiveness analysis does not necessarily require the laborious collection of data.

Cost-Benefit. This analysis, which places a monetary value on program outcomes, is commonly mistaken to be synonymous with cost analysis in general. This is unfortunate, because cost-benefit analysis is the most difficult technique to conduct correctly, and is the least meaningful method for most social service program evaluations. There are very few cases where cost-benefit analysis would be chosen for program evaluation because most social service programs are simply not amenable to this analysis.

## REFERENCES

- Haggart, S. (1978). The resource approach to the analysis of educational program cost (SN 017-080-0914-1). Washington, D. C.: U. S. Government Printing Office.
- Levin, H. M. (1983). Cost-effectiveness: A primer. Beverly Hills, CA: Sage Publications.
- Pitz, G. & McKillip, J. (1984). Decision analysis for program evaluators. Beverly Hills, CA: Sage Publications.
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- Thompson, M. (1980). Benefit-cost analysis for program evaluation. Beverly Hills, CA: Sage Publications.



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- Andersen, D. F. (1982). Problems in estimating the costs of special education in urban areas: The New York City case. Journal of Education Finance, 7, 403-424.

This article provides an example of the tabulation of special education program costs, and includes a thorough discussion of the calculation of costs such as marginal and "displaced" costs. It also provides information about conceptual issues in cost analysis, such as uncertainty in defining the scope of services and working in the context of a political environment.

- Catterall, J. (1982). The costs of school testing programs (CSE Report No. 194). Los Angeles, CA: University of California Center for the Study of Evaluation.

Catterall provides a uniquely thorough assessment of nonmonetary as well as monetary costs of testing programs. This report looks at the importance of assessing opportunity costs from the perspective of the students, the teachers, and the school district. The report provides an excellent discussion of the types of costs to consider in a complete cost analysis.

- Dorr-Bremme, D., Burry, J., Catterall, J., Cabello, B. & Daniels, L. (1983). The costs of testing in American public schools (CSE Report No. 198). Los Angeles, CA: University of California Center for the Study of Evaluation.

This report focuses on the assessment of the costs of testing in a case report format. Three case studies are described. Detail is provided on all aspects of the process of conducting a cost analysis, including identification of resources, collection of cost data (e.g., use of survey and interview techniques), and selection of cost analysis method. No outcome data was collected for this study.

- Haggart, S. et al. (1978). The resource approach to the analysis of educational project cost (SN 017-080-01914-1). Washington, D. C.: U. S. Government Printing Office.

Haggart and her colleagues have developed a method for collecting and valuing educational program costs. The most valuable aspect to this monograph is the authors' distinction between district-specific and program-comparable costs. They contend that methods for estimating costs differ according to the use of the cost data. If data are to be used only within a particular district, then absolute district costs can be used as the cost estimate. If however the cost data are to be distributed beyond the district, then alternative, theoretical, and generalizable cost-valuing methods are appropriate.

Kosier, K. (1984, October). Cost effectiveness analysis of alternatives for Chapter 1 reduction. Madison, WI: Madison Metropolitan School District.

This paper does not describe how cost data were collected, and it appears as though budget data were used. However, it does provide an interesting example of how cost-effectiveness ratios were used to help decision makers decide which program aspects were most and least effective. For example, Kosier calculated cost-effectiveness ratios across grades, achievement level, lunch programs, and aide-teacher combinations. The paper shows what comparisons can be made and how the cost-effectiveness ratios can be interpreted to assist decision makers.

Levin, H. M., Glass, G. V., Meister, G. R. (1984). Cost-effectiveness of four educational interventions (Report No. 84-All). Stanford, CA: University of California Institute for Research on Educational Finance and Governance.

Levin and his colleagues use meta-analysis to look at the cost-effectiveness of four math and reading interventions: cross-age tutoring, computer-assisted instructions, reduction in class size, and increases in daily instructional time. The meta-analysis methods of aggregating outcomes will probably not be used by most practitioners. However, the identification and tabulation of costs is thorough and could be helpful as a model. In addition, the results of the analyses may be used as a meaningful comparison for interpreting local results.

Levin, H. M. (1983). Cost-effectiveness: A Primer. Beverly Hills, CA: Sage Publications.

This text is probably the best available resource for the evaluation practitioner learning about cost-effectiveness analysis. It provides a complete description of how to figure program costs and includes sufficient technical detail to enable the reader to value his/her own resources. The value of this book is that it discusses cost-effectiveness analysis at the program level, therefore providing examples that are meaningful to practitioners. The text does fall short in detail about defining and collecting outcome data for utility, effectiveness, and benefit studies. The inexperienced reader would generally have to consult with additional resources for explanations about these steps. This book is an essential first-reader for evaluators looking for information about cost analysis methods.

Thompson, M. S. (1980). Benefit-cost analysis for program evaluation. Beverly Hills, CA: Sage Publications.

This thorough, detailed text tells how to conduct policy-level cost-analysis studies. It provides information about the data that would have to be collected in order to conduct "public" cost analyses, and therefore goes beyond the needs of most evaluation practitioners. Although it is a good reference to have on hand, it is probably not a text that the evaluator would want to read from cover to cover.

#### APPENDIX

##### Worksheet Showing the Three Steps of Tabulating Program Costs

<u>Resources</u>	<u>Cost to District</u>	<u>Explanatory Comments</u>
(1) Personnel:		
coordinator (F/T)	30,000	budget figure, includes benefits
teacher aide (F/T)	10,000	budget figure
volunteer (H/T)	0	
(2) Facilities:		
classroom	0	district overhead
furniture	0	district overhead
(3) Equipment:		
10 Apple IIe computers	0	purchased last year
maintenance	5,000	based on last year's figure
(4) Materials & Supplies:		
software	4,000	estimate obtained from dealer
supplies	0	minimal, so not included
(5) Miscellaneous:		
insurance	0	district overhead
inservice training	0	district overhead
(6) Clients:		
transportation	0	
computer disks	0	
2 hrs. parents' time	0	
6 hrs. students' time	0	